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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/736,266	12/15/2000	Adalbert Feltz	P1999,0008 US AF/BS	8740

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EXAMINER

BLACKWELL RUDASIL, GWENDOLYN A

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 06/20/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/736,266

Applicant(s)

FELTZ ET AL.

Examiner

Gwendolyn A. Blackwell-Rudasill

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 May 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) 36-44 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☒ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The non-patent literature entitled "Ferroelectric Materials and Their Applications" and "Piezoelectric Ceramics" were not considered. Because of the length of the references, applicant needs to point with particularity to the passages that are relevant to the examination of this application.

### ***Oath/Declaration***

2. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

Non-initialed and/or non-dated alterations have been made to the oath or declaration. See 37 CFR 1.52(c).

### ***Election/Restrictions***

3. Applicant's election with traverse of Group I in Paper No. 9 is acknowledged. If patentable subject matter lies with the article claims, rejoinder will be considered of the process claims in relation to those article claims.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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*The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.*

5. Claims 19-20 and 34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "apt" in claims 19-20 is a relative term, which renders the claim indefinite. The term "apt" is not defined by the claim and the specification does not provide a standard for ascertaining the requisite degree. Clarification is required.

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Claim ~~24~~<sup>34</sup> is indefinite due to the claim format. Because of the language and punctuation used in the claim, it is unclear exactly what applicant is claiming. Clarification is required.

### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

*A person shall be entitled to a patent unless –*

*(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.*

*(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.*

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C.

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122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

7. Claims 1 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by United States Patent no. 5,233,260, Harada et al.

Harada discloses a stack type piezoelectric element wherein plates of single or plural layers of a metallic material, such as copper or its alloys, are used as electrodes and interleaved with piezoelectric ceramic sheets, meeting the requirements of claim 1, (column 1, lines 40-65). The ceramic has a perovskite type structure, meeting the requirements of claim 13, (column 5, lines 40-43).

8. Claims 1-2, 13-14, 19, and 21-22 are rejected under 35 U.S.C. 102(e) as being anticipated by United States Patent no. 6,266,230 B1, Kato et al.

Kato discloses a multilayer ceramic capacitor that is formed by laminating electrode metal layers, such as copper and/or copper alloy, between ceramic layers. The ceramic layer has a perovskite structure. In addition, the element on the A position of the perovskite ( $\text{ABO}_3$ ), structure is Pb or Pb and at least one of the alkaline earth elements and at least one element selected from Nb, Ta, and W. At least one kind of element from the group including Mg, Zn, Ni, Co, Ti, Zr, and Sn is located on the B site, (columns 3-4, lines 58-33). Furthermore, a binder is used to in the formation of the green sheets, meeting the requirements of claims 1-2, 13-14, 19, and 21-22, (column 8, lines 10-13).

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***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

*(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.*

10. Claims 1-2, 4-13, 15-19, 21, 23-33, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent no. 6,266,230 B1, Kato et al., further in view of United States Patent no. 4,917,810, Tsunooka et al.

Kato discloses the limitations of claims 1, 13, 19 and 21 above. Kato does not disclose the density of the ceramic layers, the grain size of the grains in the ceramic layers, number of electrode layers, or the varying compositions of the perovskite structure as exemplified by applicant.

Tsunooka discloses a piezoelectric composite material that can be used where "high piezoelectric properties may be required such as sonic transducers, physical property measurements, ferroelectric, pyroelectric or piezoelectric keyboard switches and so on," (column 26, lines 42-50). The composite contains ceramic powders that are "mixed with a wider variety of polymers," and molded into a shape, (column 5, lines 10-14). The particle size of the ceramic material ranges between 1-400  $\mu$ , (column 5, lines 28-38). As disclosed in the examples, in particular Example 1, the components of the ceramic powder should be 98% or higher in purity, (column 9, Example 1). Tsunooka also discloses that many different types of ceramic compositions that can be used. The perovskite structures that can be used are listed in columns

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6-67, lines 62-67). For example, solid solutions of lead titanate zirconate are made. Along with the lead titanate zirconate other cations can be present, on the A position, La, Na, K, or Bi can be present. On the B position, Nb, Ta, Mg, Ni, Co, Fe, Sc, or W can be present.

Kato and Tsunooka disclose analogous inventions. Kato teaches a multilayer ceramic capacitor that utilizes a piezoelectric perovskite composition. The perovskite composition can be lead titanate zirconate. Tsunooka discloses a piezoelectric perovskite composition that can be used in many electrical devices, where the composition of the ceramic can be lead titanate zirconate. As such, it would have been obvious to one skilled in the art at the time of invention to modify the ceramic capacitor of Kato with the ceramic composition of Tsunooka to manufacture an electrical device which is inexpensive to make, has thermal resistance and stable at high DC bias voltage, (Kato, column 3, lines 50-55).

Neither Kato nor Tsunooka specifically disclose the number of stacked layers as exemplified by applicant. However it is disclosed by Kato that green sheets of the ceramic should be alternately layered with metal electrodes, with the printing and lamination steps "repeated to obtain the required number of layers," (column 8, lines 17-31). Based upon the aforesaid information, it is within the ability of one skilled in the art at the time of invention through routine experimentation to optimize the number of layers that should be present in the electrical device.

11. Claims 1-3, 13, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent no. 6,266,230 B1, Kato et al., further in view of United States Patent no. 4,128,489, Seo.

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Kato discloses the limitations of claims 1-2 and 13 above. Kato does not disclose that the polymer is a polyurethane or the specific composition of PZT.

Seo discloses a piezoelectric material that utilizes a urethane rubber in the polymer binder mix, (column 2, lines 35-36). Further examples of the specific polymer that can be used are listed in Table 9, column 9. In addition, Example 7, set out that the formula of PZT satisfies the equation  $\text{Pb}(\text{Zr}_2\text{Ti}_{1-x})\text{O}_3$ , (column 8, lines 4-5).

Kato and Seo disclose analogous inventions. Kato teaches a multilayer ceramic capacitor that utilizes a piezoelectric perovskite composition. The perovskite composition can be lead titanate zirconate. Seo discloses a piezoelectric perovskite composition that can be used in many electrical devices, (column 2, lines 1-3), where the composition of the ceramic can be lead titanate zirconate. As such it would have been obvious to one skilled in the art at the time of invention to modify the device of Kato with the lead titanate zirconate composition of Seo to produce an electrical device having high piezoelectric modulus and reduced anisotropy of piezoelectric modulus, (Seo, column 1, lines 43-50).

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gwendolyn A. Blackwell-Rudasill whose telephone number is (703) 305-9741. The examiner can normally be reached on Monday - Friday; 6:30 am - 3:00 pm.

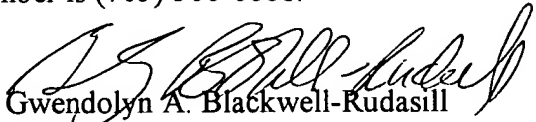
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (703) 308-3822. The fax phone numbers for the



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organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

  
Gwendolyn A. Blackwell-Rudasill  
Examiner  
Art Unit 1775

gbr  
June 17, 2002

  
DEBORAH JONES  
SUPERVISORY PATENT EXAMINER